Serbia Energy Efficiency Fund Feasibility Study

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For the

SERBIA ENERGY EFFICIENCY AGENCY

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APPENDIX

1 Introduction

This document assesses the feasibility of using loan guarantees and a low-interest credit line as the financing mechanism for the Serbian Energy Efficiency Fund (hereinafter the Fund.) This "sustainable guarantee" financing mechanism would be provided to local banks to stimulate on-lending for energy efficiency projects at residential buildings. By combining loan guarantees and a low-interest line of credit into a sustainable guarantee, the Fund can solve two problems many emerging market countries face, namely: a lack of affordable medium- to long-term financing and the prohibitive credit risks of residential borrowers.

Nexant, Inc., under contract with the United States Agency for International Development (USAID), is supporting the World Bank's creation of the Fund and providing technical assistance to the Serbian Energy Efficiency Agency (SEEA). Over the last two years, Nexant has conducted technical and financial analysis of numerous energy efficiency projects at institutional and residential buildings in Serbia. The results of this analysis have been used to assist SEEA in evaluating three main financing mechanisms, including: direct loans, interest rate reductions, and loan guarantees on selected energy efficiency projects.

Based on previous analysis, the interest rate reduction and direct loan options have each been excluded as the sole financing mechanism for the Fund. Interest rate reductions neither significantly altered the economic feasibility of energy efficiency projects nor remedied credit risk problems. Direct loans, while able to provide attractive financing terms to borrowers, would require the Fund to operate as a bank. Under the direct loan option, the Fund would fully bear borrower credit risks and incur all the costs associated with acquiring the human resources and organizational infrastructure needed to make loans. Loan guarantees, on the other hand, can mitigate credit risks and enable borrowers to receive attractive financing terms. To optimize the loan guarantee, the sustainable guarantee option is being recommended. This option incorporates the benefits of standard loan guarantees with a low-interest line of credit. This financing mechanism will help the Fund swiftly put its resources to use by:

- Stimulating on-lending by local banks for energy efficiency projects on a revolving basis;
- Guaranteeing participating banks up to 50% of borrower repayment on loans; and
- Enabling residential borrowers to receive bank loans (at below market interest rates) through the Fund's low-interest line of credit.

The focus on residential borrowers reflects that increased lending to this underserved sector can foster investment, promote economic growth, and secure environmental gains.[1] Further, the Fund will target projects that support the Government of Serbia's goal of reducing electricity demand. Specifically, the Fund will prioritize investments that involve converting residential buildings and homes from electric heating to either natural gas or district heating systems as well as projects that utilize low-cost energy efficiency packages such as wall and roof insulation and weather-stripping.

[1] Energy efficiency improvements in other key sectors, including institutional facilities such as schools and hospitals will be financed via a World Bank loan to the Government of Serbia.

The remainder of this document provides an overview of the sustainable guarantee option and evaluates its merits from a qualitative and quantitative perspective. The analysis is as follows:

In Section 2, the key operational elements of the sustainable guarantee mechanism are described. This includes a summary of potential loan terms for residential borrowers as well as an overview of Fund procedures, credit standards, and risks to key stakeholder groups.

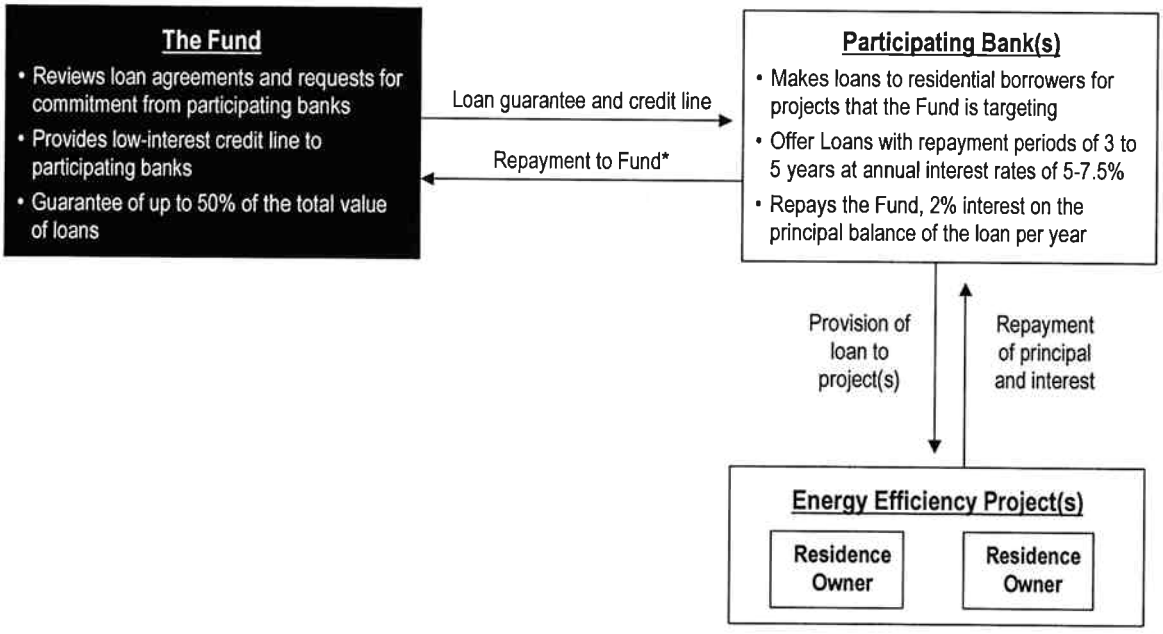
In Section 3, a series of energy efficiency case studies are utilized to conduct quantitative analysis of the sustainable guarantee option. Case studies are based on the results of energy audits that were completed in Serbia during the last half of 2002. A financial model was developed to analyze the case studies and to assess the repaying capacity of individual residential borrowers. Further, the results of surveys conducted by the Alliance to Save Energy are used to identify the likely borrower profile for the case study projects as well as to help interpret the analysis results and incorporate the perspective of local stakeholders.

In Section 4, the results of analyses contained in Sections 2 and 3 are utilized to develop recommendations regarding the use of the sustainable guarantee option and next steps to facilitate the establishment of the Fund.

2 Overview of the Sustainable Guarantee Financing Mechanism

The sustainable guarantee option that is being considered for the Fund would provide selected local banks with a package of loan guarantees and a low-interest line of credit to catalyze the development of the residential energy efficiency market in Serbia. The Fund, which would house its financial resources at a custodian bank, would establish a credit line to be offered to participating banks for the sole purpose of financing targeted energy efficiency projects. The dedicated credit line would cover medium- to long-term loans and carry a low interest rate, thereby enabling participating banks to on-lend to residential borrowers at favorable terms (i.e., offer loans with below market interest rates and extended repayment periods).[2] The Fund would also mitigate the credit risk of lending to residential borrowers by guaranteeing up to 50% of borrower repayment on loans. It is envisioned that the Fund could be initially capitalized via a Global Environment Facility (GEF) grant given GEF's strong support of climate change and energy efficiency initiatives.

By establishing this sustainable guarantee mechanism, the Fund would help remove several key barriers to the local development of energy efficiency projects: 1) the credit risks posed by residential borrowers, 2) lack of a dedicated financing source for energy efficiency, and 3) the high cost of debt that outstrips the borrowing capacity of most residence owners. Figure 2-1, shown below, illustrates the mechanics of the sustainable guarantee option.



*Note: Repayment from participating banks would be used to capitalize the Fund so that it can operate on a revolving basis.

Figure 2-1: Sustainable Guarantee Financing Mechanism

Loans made from the credit line would be done on a reimbursement basis, where a participating bank first makes the loan to the individual residential borrower and is then reimbursed for the

[2] See Appendix D for a summary of relevant international experience in energy efficiency Funds.

full loan amount by the Fund (see Appendix C for a preliminary set of eligibility criteria for the Fund's selection of participating banks). In this manner, the credit line from the Fund would operate on a "demand-driven" basis from participating banks so that funding would be available to support the maximum number of actual projects. The repayment of loans by residential borrowers to participating banks—who in-turn would repay the Fund—would enable the Fund to operate on a revolving basis. Participating banks would pay a nominal rate of interest on the credit line, initially estimated at 2% of the principal balance of the loan per year. This interest would be used to partially defray the Fund's operating costs (e.g., salaries and/or administrative costs), thereby providing further support to the overall goal of developing a self-sustaining financing mechanism.

Guarantees provided by the Fund would cover both principal and interest repayment for up to 50% of the total value of a loan.[3] The Fund and participating banks would share the risk of project default on a *pari passu* (equal percentage) basis.[4]

Under this structure, all documentation and processing for loans made under the sustainable guarantee would be carried out by participating banks—leaving the Fund's staff to focus on reviewing technical elements of projects and ensuring that the Fund's resources are utilized in an optimal manner. Further, by establishing relationships with local banks, the Fund can tap into a bank's existing client base and draw on their expertise in marketing financial products.

2.1 Borrowing Terms Under the Sustainable Guarantee

The main purposes of the sustainable guarantee option is to facilitate and accelerate bank lending for individual projects and to lower the costs of financing for residential borrowers as an incentive to pursue energy efficiency projects. Potential loan terms to borrowers under this option are likely to be as follows:

- Loan repayment terms ranging from three- to five-years;
- Payment terms may be monthly, quarterly, semi-annual, or annual as determined by the participating bank;
- Potential grace periods (on principal only) not to exceed one year; and
- Maximum annual interest rates based on 5.5% spread over the credit line interest rate to the participating bank.

2.2 Proposed Procedures and Credit Standards

It is envisioned that the Fund will require at least two dedicated loan officers and one engineer on staff to review draft loan agreements and project descriptions that accompany a participating bank's "request for commitment." The following procedures would be carried out by the Fund and participating banks:

[3] In effect, the Fund would provide participating banks with a 50% guarantee by forgiving 50% of the outstanding balance of the loan in case of borrower default.
[4] Further, funds that are not lent out could be invested in short-term investment-grade accounts.

- The bank will submit a request certifying the information that it has provided is correct;
- The bank will state the loan term, grace period (if applicable), and repayment schedule;
- The Fund will provide reimbursement to the participating bank upon receipt of a copy of the loan agreement between the bank and the borrower; and
- The bank will begin repayment to the Fund six months from the date the loan agreement is signed with the borrower, and will be made on a semi-annual basis.

The Fund will require participating banks to apply the following credit standards when evaluating potential borrowers:

- The borrower must be current on their heating and electric bills;
- The borrower must maintain or open a bank account;
- The borrower must have worked for their current employer for at least one year;
- The amount of the loan payments for the energy efficiency project must not exceed 30% of the borrower's current level of pre-tax earnings; and
- The borrower must provide at least one co-signer for the loan. The co-signer must be a person different from the borrower's employer.

Once operational, the Fund may adjust criteria and/or develop new criteria as applicable.

2.3 Potential Risks To Stakeholders

Under the sustainable guarantee option, there will be a variety of risks to each stakeholder group. To the extent possible, these risks, which are summarized below, will be mitigated as part of the Fund's operating procedures and policies as well as by individual agreements that are made between residential borrowers, participating banks, and the Fund.

Residential borrowers: The main risks that borrowers will face are technology and project performance risks with respect to equipment malfunction or failure to achieve the expected energy savings. However, these risks can be mitigated through agreements with equipment suppliers and system designers (i.e., warrantees or guarantees on technical performance). Moreover, borrowers could face market risks from increases in fuel and/or district heating prices that adversely impact the economics of projects. However, this risk is small since there is a large existing price differential between electricity and both gas and district heating. Further, any increases in local fuel prices would likely be accompanied by parallel increases in electricity prices.

Banks: For participating banks, the major risk is borrower default, while a lesser risk is that smaller consumer-type loans can become an administrative burden. The risk of borrower default will be cut in half by the Fund's 50% guarantee while administrative costs can be minimized over time if banks are able to identify a project developer that can aggregate numerous small projects into one bundled project.

Fund: For the Fund, the major risks are borrower default and the insufficient utilization of the sustainable guarantee option. To the extent possible, risk of borrower default can be mitigated by working with banks to define acceptable credit standards and to channel the use of the Fund's resources to projects that generate a sufficient level of cash flow to repay debt. Risks relating to the utilization of the Fund can be minimized through marketing and awareness campaigns that stimulate demand for energy efficiency projects. The Fund would also carry the risk of default by the participating bank. This risk, albeit at a relatively low level, could be mitigated by adhering to the participating bank eligibility criteria listed in Appendix C.

3 Analysis of the Sustainable Guarantee Option

The Fund is being established to help remove barriers to energy efficiency investments in Serbia by offering banks a financing mechanism that combines a loan guarantee with a low-interest line of credit to spur on-lending for projects in the residential sector. An analysis was conducted of case study projects at residential buildings to assess the viability of this financing mechanism. The cases studies, shown below in Table 3-1, are based on energy audits conducted in Serbia in late 2002 and are representative of projects that would make-up the Fund's deal flow (See Appendix B). Investment costs and savings are listed in Serbia & Montenegro Dinars (CSD).[5]

Table 3-1 Energy Efficiency Project Case Studies for Residential Buildings

Case –Project Type	Investment (in CSD)	Annual Savings (in CSD)	Payback Period (in Years)
Residential Building Projects			
Case A: conversion from electric heat to district heating	1,482,833	561,628	2.6
Case B: conversion from electric heat to natural gas heating	1,212,858	772,239	1.6
Case C: energy efficiency improvement package	705,020	242,411	2.9
Single Family Home Projects			
Case D: conversion from electric heat to district heating	96,377	77,792	1.2
Case E: conversion from electric heat to natural gas heating	169,142	81,293	2.1
Case F: energy efficiency improvement package	127,690	68,459	1.9

Each case has a payback period of less than three years and involves the use of proven technologies, indicating their technical and economic feasibility.[6] However, whether or not these projects can actually be implemented depends in large part on both the availability and terms of local financing options and the presence of creditworthy borrowers. Therefore, an analysis was conducted of the case studies assuming they are financed under current bank loan terms as well as terms that would be offered by banks through the Fund's sustainable guarantee option. In order incorporate the perspective of local stakeholders into this analysis, the results of the Alliance to Save Energy's (Alliance) field research was used to assess likely borrower profiles and to better understand lending requirements of the banking community.

3.1 Characteristics of Potential Borrowers

Under current market conditions, the only feasible borrowers for the types of projects contained in Cases A to F are: 1) individual flat owners in an apartment building (who jointly agree to

[5] The current exchange rate is approximately 1 U.S. dollar (USD) = 57 CSD (*The Economist*, December 2003).
[6] Each case study generates a positive net present value (NPV) for residence owners over a 10 year period.

finance a project,) or 2) single family home owners. Housing Associations (HAs) are not considered viable candidates for loans based on the results of discussions with both banks and HA presidents. In general, barriers to lending to the residential market, include:

- Lack of credit history for both residence owners (flats and single family homes) and HAs;
- Reluctance of potential borrowers to take out loans;
- Need for HAs to obtain 100% tenant approval before proceeding on a project; and
- Low awareness of the benefits of energy efficiency by both borrowers and lenders.

The results of the Alliance's field research underscore the challenges the Fund will encounter in finding suitable borrowers. Key findings are reviewed below.

3.1.1 Individual Residence Owners

Despite the numerous barriers to making loans to individual residence owners, banks indicated a strong interest in expanding their residential loan base. Many banks stated that they are already devising residential loan packages for their existing customers. Current bank requirements for making loans to residence owners include that an individual have: an account at the bank, clear legal ownership of their residence, at least one creditworthy co-signer on the loan, employment at their current job for at least two years, and a sufficient level of income to repay the loan. Results of the Alliance's residential survey (that address several of the bank lending requirements) highlight the difficulties most residence owners would encounter in obtaining a loan for an energy efficiency project.

Bank Account/Loan History: Serbian households have very limited exposure to banks and even less experience with borrowing—of the almost 1,600 Serbian households that were surveyed, less than half (45%) of the respondents have a bank account and less than 10% have taken out a bank loan in the last two years.

Employment Status: 44% of respondents have worked for the same employer for at least two years and therefore, would meet this banking lending requirement. However, 53% of the respondents said they are currently not employed.

Borrowers Income: The median monthly income of respondents is CSD 8,360. Several banks stated that to qualify for a loan, a borrower's monthly loan payments can not exceed 25% of their monthly income. At this median income level, the 25% debt-to-income requirement highlights the importance of borrowers receiving loans with extended repayment terms.

Payment of Utility Bills: Almost 90% of respondents stated that they are current (within two months) on their electric and/or district heating bills. Given that the median energy cost of respondents accounts for almost 30% of their total income, this indicates that the majority of residence owners should be able to repay loans that fall below this ceiling.

Willingness to Borrow: Over 20% of respondents stated that they would "probably" or "definitely" take out an energy efficiency loan of USD 1,000 (CSD 57,000) and USD 2,500 (CSD 142,500). Approximately 15% of respondents indicated the probability of borrowing USD 5,000 (CSD 285,000) or USD 10,000 (CSD 570,000) to finance an energy efficiency project.

Since these percentages are significantly higher than the percentage of respondents who have ever taken a loan (less than 10%), these survey findings indicate that an effective energy efficiency marketing campaign could increase the current level of residential borrowing, especially for smaller-sized loans.

3.1.2 Housing Associations

HAs are legal entities that oversee the maintenance of residential buildings. Although HAs have the potential to be effective bundlers of small energy efficiency projects, banks view them as inappropriate borrowing candidates since they:1) lack authority over tenants, 2) do not have an independent income, and 3) do not own the buildings that they oversee.[7]

HA presidents that participated in the Alliance's focus group also expressed reluctance to take out bank loans given their inability to collect funds from tenants. HAs presidents noted that they have difficulty even collecting CSD 100 to 120 from tenants for general repairs. Further, to finance a joint investment, an HA needs to secure 100% tenant approval which would be difficult given the low level of awareness of tenants on the benefits of energy efficiency. Residential survey results confirm the opinions of the HA presidents—only 10% of the respondents believed it would be possible for their HA to secure 100% approval for individual loans of USD 2,500 or below. The probability of obtaining 100% approval falls to roughly 7% for larger sized loans of USD 5,000 and USD 10,000.

3.2 Case Study Analysis

In order to assess the attractiveness of residential energy efficiency projects to both borrowers and lenders, an analysis was conducted of each case study assuming that it is implemented under both current bank loan terms and those that would be offered using the sustainable guarantee option. Since each case study already has an attractive payback period for the residence owner, this analysis focused on assessing a borrower's ability to repay a bank.[8] For the purposes of this analysis, the repaying capacity of individual residential building flat owners and single family home owners is assessed (and defined) in the following two ways:

- Debt-to-Income Ratio: The annual debt service on a project is divided by the median annual income (CSD 100,320) of respondents to the residential survey. For the base case, a debt-to-income ceiling of 25% is used to determine whether or not a bank would lend to an individual borrower.[9] Specifically, only borrowers with a ratio of 25% or less are considered to have sufficient repaying capacity. For the sustainable guarantee scenarios, a higher debt-to-income ceiling of 30% is used to reflect the reduced risk to banks.
- Net Cash Flow-to-Income Ratio: The annual savings generated by a project under all scenarios, minus the annual debt service on a project (i.e., net cash flow), is divided by the

[7] Per the Alliance's survey, only one bank had made an HA loan with unsuccessful results.
[8] Cases A to C assume projects are implemented at buildings with 5 floors and 11 separate flats. Debt payments and savings at the project (entire building) level are divided by 11 to show individual flat owner results.
[9] This 25% threshold was cited by several banks that participated in the Alliance's banking survey.

median annual income of residential owners to illustrate that energy efficiency investments can often generate sufficient savings to repay loans.

3.2.1 Base Case Scenario Results

Based on discussions with local banks, it was assumed for the base case scenario that loan terms for residential projects would include a 15% annual interest rate and a three-year repayment period.[10] It was assumed that projects are 100% debt financed. Further, the size of the loans for each case study is within the range for which respondents to the Alliance survey indicated the highest willingness to take out a loan (i.e., USD 1,000 to USD 2,500).

Debt-to-Income Ratio Analysis

Figure 3-1, shown below, illustrates that under this scenario, all of the case studies exceed the 25% debt-to-income ratio ceiling imposed as a lending requirement by banks.

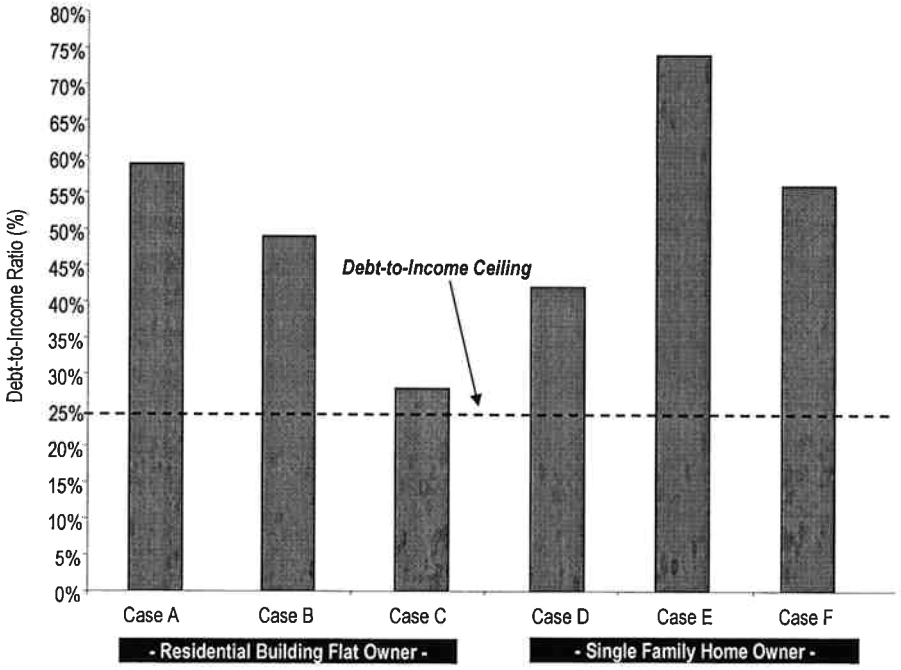


Figure 3-1: Base Case Scenario – Debt-to-Income Analysis

The overall poor performance of the cases studies reflects that, under current conditions, the typical Serbian residence owner's income (CSD 100,320 median annual income) is too low to meet the debt payments for these projects.[11] For residential building cases, the debt-to-income ratio improves only as you move to lower cost energy efficiency measures, dropping from almost 60% in Case A (conversion from electric to district heating) to below 30% for Case C (energy efficiency improvement package). For projects at single family homes, the ratio also improves for low cost measures such as Case D, but remains above 40% for all cases.

Single family home Cases E (conversion from electric heating to gas) and F (energy efficiency improvement package) have higher debt-to-income ratios than the comparable cases (Case B and

[10] Based on meetings between Nexant and local banks as well as results of the Alliance's banking survey.
[11] See Appendix E for further details and cash flow statements for each case study.

C respectively) at residential buildings. For the gas conversion projects, this reflects the economies of scale in obtaining gas connections for a building with multiple residences compared to a single family home.

Net Cash Flow-to-Income Analysis

When the annual savings generated by the case studies are factored into the assessment of the borrower's repayment capacity, the situation dramatically improves. Figure 3-2, shown below, illustrates that Cases B, D, E, and F all have a positive net cash flow-to-income ratios, indicating that residence owners would immediately feel the economic gains of implementing an energy efficiency project financed through a bank loan. For cases B, D, E, and F, residence owners not only increase their ability to repay loans, but they also increase their disposable income—which, given the challenging economic conditions, could be a powerful incentive to increase the willingness of residence owners to take out loans.

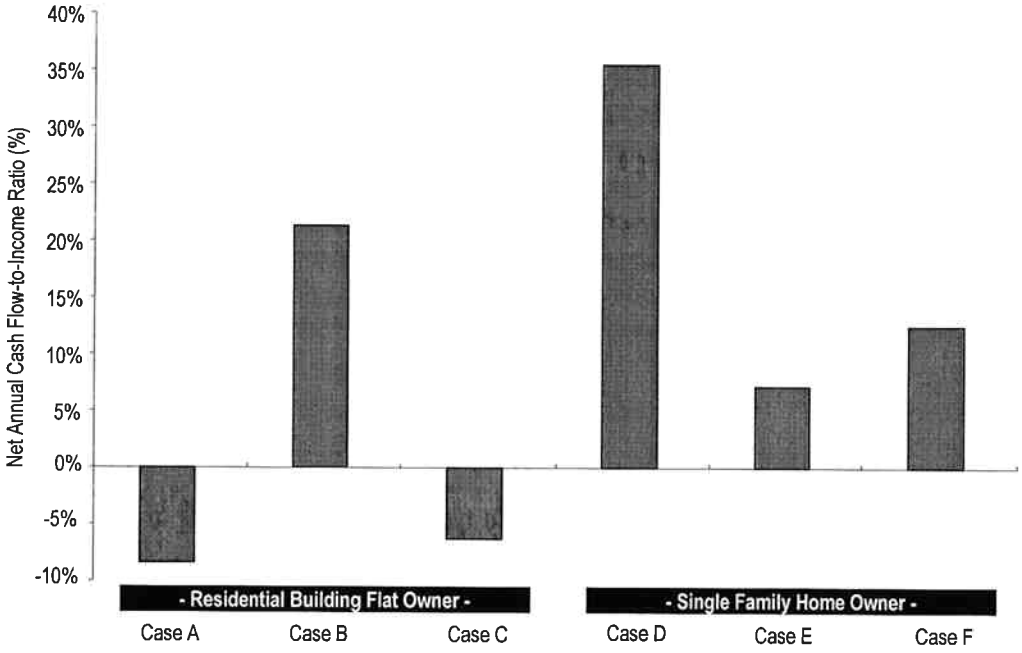


Figure 3-2: Base Case Scenario – Net Cash Flow-to-Income Analysis

The level of savings exhibited by the case studies reflects that residence owners will significantly reduce their energy costs by shifting away electricity which is approximately 2.5 times more expensive than district heating and 3 times more expensive than natural gas.[12] The single family home cases are all strong performers, reemphasizing that Cases D, E, and F all have a simple payback period of approximately two years or less. These positive results, however, stand in sharp contrast to the perceptions of local banks and borrowers. Alliance banking survey results reveal that only one out of the ten banks surveyed believe that lower energy bills make borrower repayment more likely.[13]

[12] On a per kilowatt (kW) basis, residential end-users pay 5.5 CSD/kW for electricity, 1.5 CSD/kW for district heating, and 1.32 CSD/kW for natural gas.

[13] Even for projects that banks are familiar with and consider to be valuable home improvements (e.g., district heating), banks stated that they do not factor monetary savings from these projects into loan-making decisions.

3.2.2 Sustainable Guarantee Scenario Results

The Fund's provision of the sustainable guarantee would enable banks to provide residential borrowers with more favorable loan terms (i.e. lower interest rate and longer repayment period) compared to the base case scenario. For the purposes of this analysis, the following two sustainable guarantee (SG) scenarios were developed:

- SG Scenario 1: Assumes that each project receives a loan with repayment terms ranging from three to five years with an annual interest rate of 7.5%[14]
- SG Scenario 2: Assumes loan terms of three to five years with a 5% annual interest rate.

Under both scenarios, it is assumed that bank lending requirements would accept projects in which a borrower has a debt-to-income ratio of up to 30%. The higher allowable level reflects the Fund's provision of a 50% loan guarantee, thereby reducing risks of borrower default. The 30% threshold is also consistent with findings from the Alliance's survey in which the median energy costs of respondents account for approximately 30% of their total income.

3.2.3 Scenario 1 Results

Debt-to-Income Ratio

Figure 3-3, shown below, compares the debt-to-income ratio for the case studies under SG Scenario 1 to the base case.

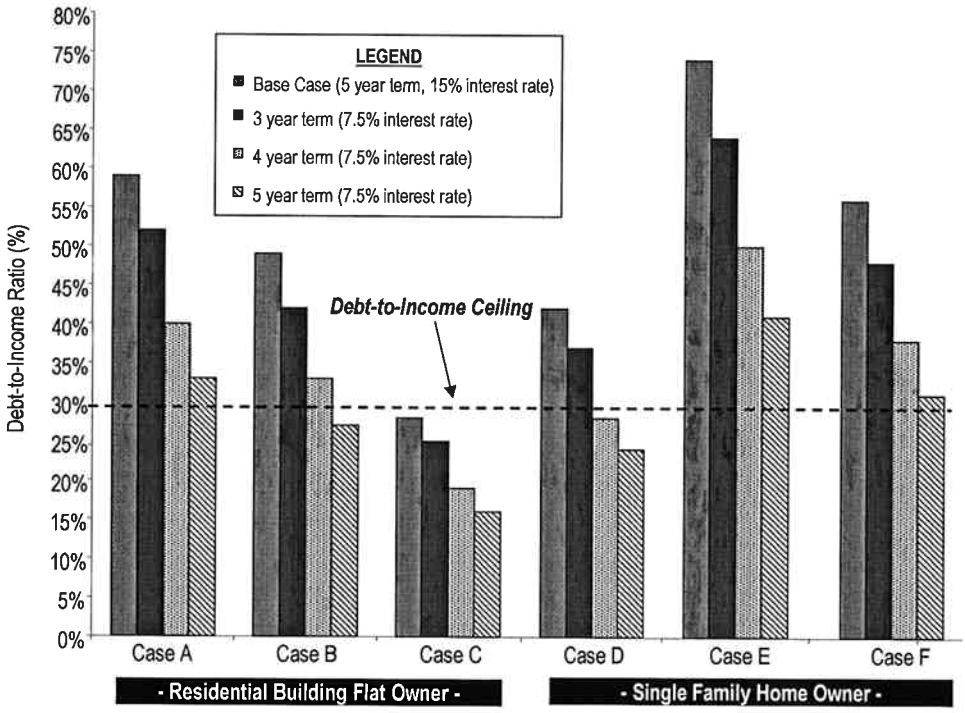


Figure 3-3: Sustainable Guarantee Scenario 1 – Debt-to-Income Ratio

[14] These terms reflect responses from banks regarding the potential of making loans guaranteed by the Fund.

By stretching loan repayment periods out to five years, and cutting annual interest rates in half compared to the base case (down from 15% to 7.5%), Cases B, C and D meet the 30% assumed debt-to-income bank lending ceiling. Further, Cases A and F greatly benefit from the extended loan term, with both cases achieving debt-to-income ratios of 33% and 31% respectively which are just slightly above the 30% ceiling. However, the ratio for Case E (which is the highest cost project of the single family home cases) remains above 40%.

Net Cash Flow-to-Income Analysis

Figure 3-4, shown below, illustrates that by providing banks with a low interest credit line and 50% loan guarantee, the Fund would enable borrowers to receive loan terms that are favorable enough to allow them to fully repay their debt out of the savings from a project.

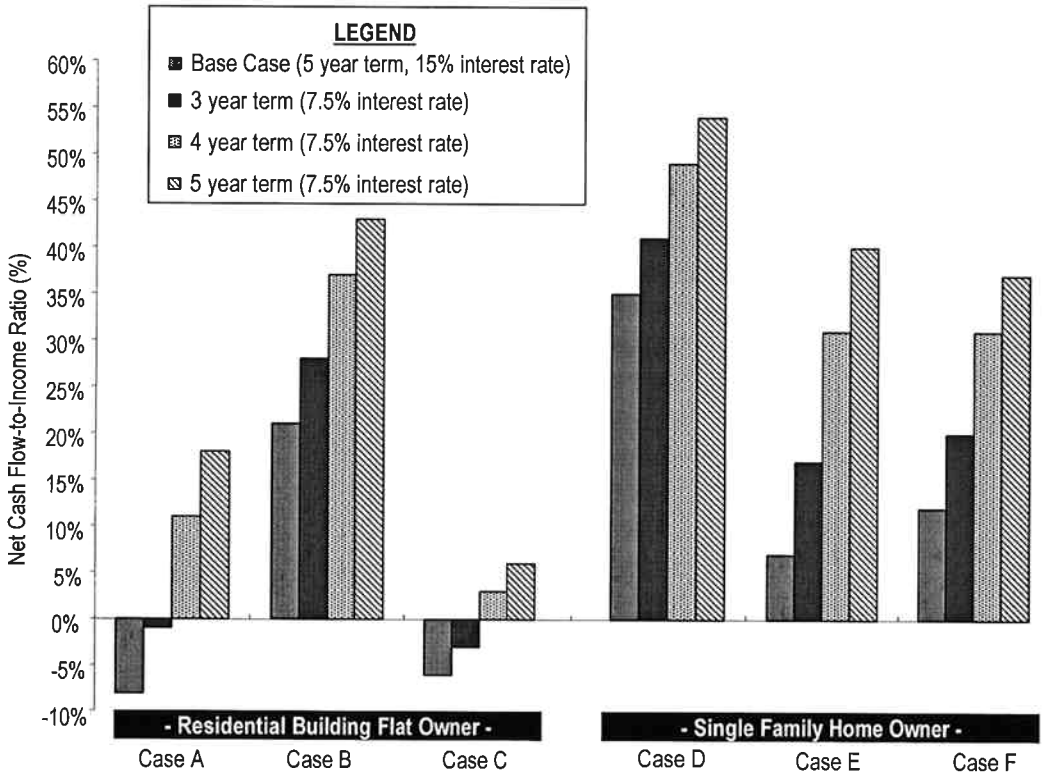


Figure 3-4: Sustainable Guarantee Scenario 1 – Net Cash Flow-to-Income Ratio

With a repayment term of four years, all of the case studies have a positive net cash flow-to-income ratio, indicating that local residence owners would have a significant incentive to take out an energy efficiency loan: By implementing the case study projects, residence owners would actually increase their "cash-in-hand." Further, from the perspective of lenders, the high savings for residence owners should reduce their credit risk, which should make offering loans to new customers more tenable, over and above the support provided by the Fund.

3.2.4 Scenario 2 Results

Debt-to-Income Analysis

Figure 3-5, shown below, illustrates that, as expected, the lower the interest rate, the better debt-to-income ratio. SG Scenario 2 (5% annual interest) coupled with the receipt of a five-year loan repayment term enable Cases B, C, D, and F to achieve debt-to-income ratios that are below the 30% ceiling. The performance of Case A also improves, falling to a level of just 31% despite having the highest total investment cost of all the case studies. Case E, however, achieves only marginal gains under the most favorable loan terms, indicating that further interest rate reductions will not increase the viability of this case to lenders.

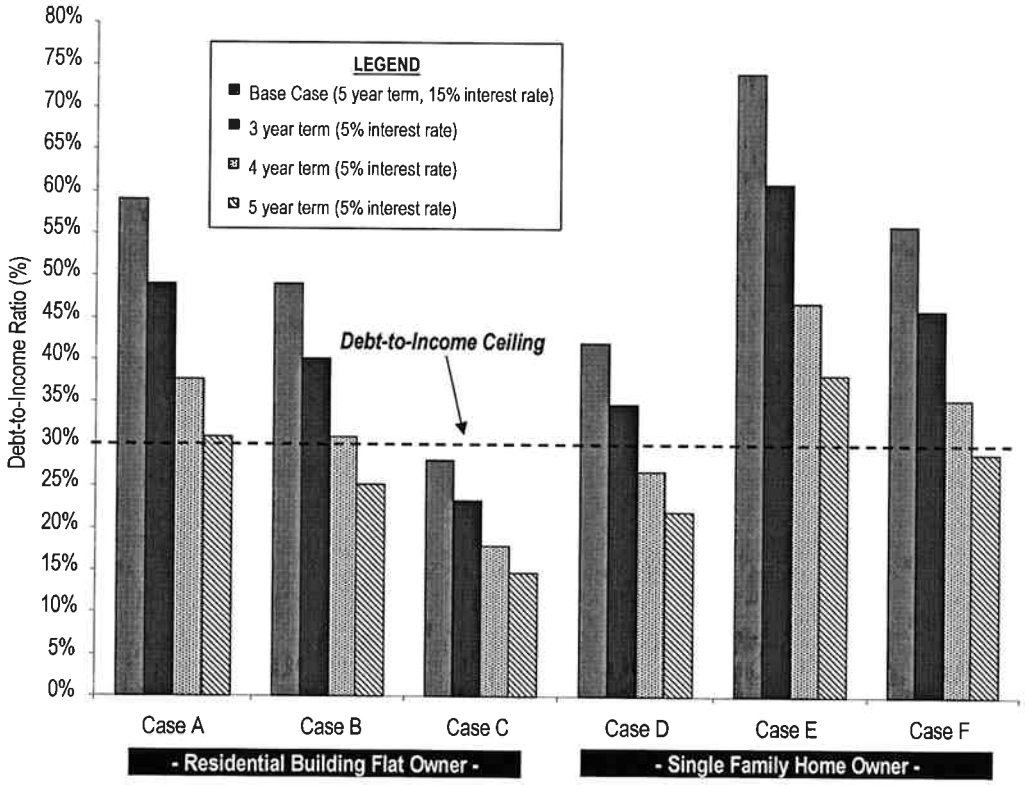


Figure 3-5: Sustainable Guarantee Scenario 2 – Debt-to-Income Ratio

Net Cash Flow-to-Income Analysis

Under SG Scenario 2 all of the projects, except Case C, earn a positive net cash flow with a loan that has a repayment period of three years. Given the general preference of borrowers and lenders to engage in loans with shorter terms, the ability to generate positive cash flows for loans terms of three years should be attractive.

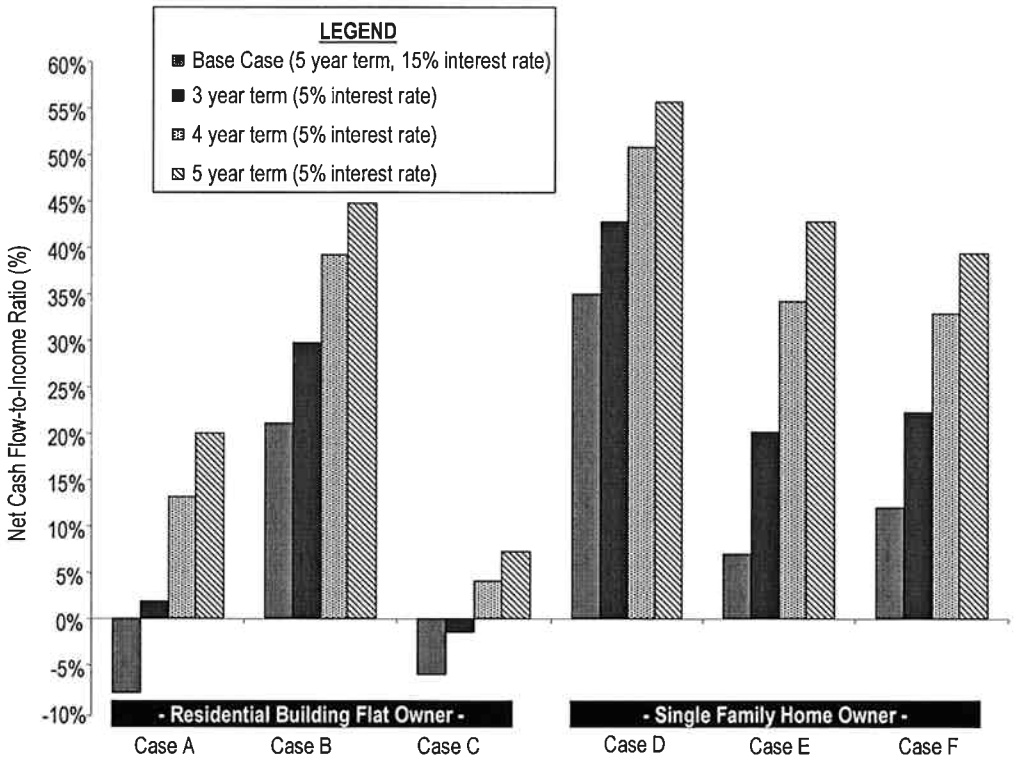


Figure 3-6: Sustainable Guarantee Scenario 2 – Net Cash Flow-to-Income Ratio

Case study analysis results augur well for the Fund's ability to stimulate energy efficiency investments at multifamily residential buildings and single family home in Serbia. Specifically, the sustainable guarantee option will enable borrowers to fully repay their debt out of the savings that they realize from energy efficiency projects while also increasing their "cash-in-hand." For lenders, the debt repayment capacity of borrowers significantly improves and credit risks to residential clients are cut in half. However, to be successful, the Fund would need to engage in a range of market development activities that address the following barriers: low awareness of the benefits of energy efficiency, narrow base of potential borrowers, problems in obtaining approval for communal investments in residential buildings, reluctance of banks to factor the positive cash flow generation from projects into lending decisions, limited bank experience in financing energy efficiency projects, and lack of project developers in the market that can bundle multiple projects into a single loan package.

4 Recommendations and Suggested Next Steps

Forthcoming efforts to establish the Fund should center on two key areas: 1) front-end development activities relating to the organizational set-up of the Fund and the structure of its sustainable guarantee, and 2) the start-up of energy efficiency market development initiatives that support the Fund by stimulating market demand and expanding its base of borrowers. Listed below are a set of recommendations that concomitantly address these two main areas.

4.1 Front-end Development Activities for the Fund

- *Develop Relationships with Partner Banks*. An initial series of meetings should be conducted with local banks to explore their potential willingness in offering residential energy efficiency loans under the Fund's sustainable guarantee mechanism. These meetings should include a discussion of the potential lending terms that residential borrowers would receive via the Fund. Further, the marketing capabilities of banks should be reviewed in order to ensure their ability to effectively promote the Fund.
- *Assess Custodian Bank Candidates*. The custodian bank will be responsible for safeguarding the Fund's assets, executing transactions with participating banks, and collecting payments on behalf of the Fund. Given the importance of these roles, a review of potential custodian bank candidates should be carried out in the near-term. Custodian banks should be evaluated in terms of the types of services they would provide to the Fund, their relevant experience, and expected level of fees.
- *Identify Staffing Requirements for the Fund*. It is anticipated that the Fund will be led by a full-time director, supported by two loan officers, and an engineer. The primary functions of the Fund's staff will be threefold: 1) to review draft loan agreements and project descriptions that accompany a participating bank's request for commitment, 2) to assess the technical aspects of projects (e.g., ensure they meet minimum eligibility criteria), and 3) to assist local stakeholders in marketing the Fund to potential borrowers.
- *Assess Options to Ensure the Sustainability of the Fund*. An evaluation should be conducted of the Fund's revenue generating capacity (e.g., fees that are a portion of the credit line interest rate) as well as the potential for obtaining outside sources of capital.
- *Test-market the Fund to Residential Borrowers*. The ultimate success of the Fund will rest on its ability to convince residential borrowers of the merits of energy efficiency investments. Therefore, test-marketing efforts should focus on the following three main areas: 1) the willingness of borrowers to take out loans under the terms of the sustainable guarantee, 2) identification of priority types of energy efficiency projects for borrowers, and 3) options to tailor the Fund's offerings to meet borrower needs.
- *Prepare Marketing Materials*. In order to help market the Fund to potential partner banks, project developers, and outside investors who may serve as a future source of capital, marketing materials should be developed that highlight the key elements of the sustainable guarantee option, its target market, and the potential of energy efficiency projects to generate monetary savings.

4.2 Energy Efficiency Market Development Initiatives

- *Increase Local Awareness of the Benefits of Energy Efficiency*. Residential survey results as well as discussions with the banking community in Serbia underscore a lack of awareness of energy efficiency projects and their inherent economic benefits. Low awareness levels can result in the underutilization of the Fund and should therefore be addressed prior to the start-up of the Fund's operation. In the near-term, strategies for a public awareness campaign should be developed, targeting potential borrowers and lenders. Borrower-focused campaigns should highlight that energy efficiency projects can increase the cash-in-hand of residence owners and generate enough savings to repay debt on projects. Lender-focused campaigns should emphasize that energy efficiency projects generate a positive cash flow that can increase the repaying capacity of borrowers.
- *Engage Local Gas, District Heating, and Electric Utilities*. Given that the implementation of energy efficiency projects would benefit local utilities (by adding new customers for gas and district heating companies as well as helping electric utilities with demand side management activities), the Fund should start to explore ways in which these companies can support its operations. This includes assessing the potential for local gas, district heating, and electric companies to help market the Fund to their existing client base, assist with collections, and, over time, borrow from the Fund to develop projects.
- *Promote the Development of a Local Energy Services Industry*. The emergence of a robust energy services industry is a critical component of creating a sustainable energy efficiency market in Serbia. Energy service companies (ESCOs) could fill a major void in the local market by providing residence owners with the technical and financial services that are needed to implement a project. ESCOs can assist the Fund by acting as an integrated delivery channel/marketing agent that bundles numerous small-sized projects into one large transaction. The Fund can initially promote the emergence of an ESCO industry in Serbia by sponsoring training programs that help build the capacity of existing local stakeholders (e.g., equipment suppliers and utilities) to deliver energy services. Further, marketing efforts can target international ESCOs that might view the presence of the Fund and the sustainable guarantee as an attractive way to wade into a new market.
- *Evaluate Options to Strengthen HAs*. The results of the market surveys and focus groups demonstrate that HAs would need to undergo considerable legal, financial, and operational reform before they become acceptable loan candidates. However, HAs can play an important role as a facilitator of communal investments at residential buildings, serving as an initial point of contact between participating banks and potential borrowers.
- *Provide Added Support for Low-income Residents*. HA presidents that participated in focus groups noted that flat owners in residential buildings often have significant differences in earning power, which presents a problem for implementing communal investments. One potential option for the Fund is to consider providing grants to low-income residence owners to encourage their participation in a project. The grant could be provided by the Fund itself or perhaps through a donor agency or local government entity. Experience in Lithuania highlights that combining grants with favorable loans can be a catalyst to residential energy efficiency investments (see Appendix D).

- *Include a Technical Assistance Component for Market Development.* Given that the energy efficiency market in Serbia is in its embryonic stage, local stakeholders will likely require support throughout project development. The Fund can help mobilize the local market by offering targeted technical assistance to support local stakeholders in areas such as preparing feasibility studies and requests for financing. Experience in Sri Lanka, Bulgaria, and Lithuania indicates that providing technical assistance in conjunction with energy efficiency financing mechanisms can be a highly effective method of stimulating project development.

Appendix A References

Attitude to Energy Efficiency Loans – Discussions with HA Managers (Focus Groups). April 2003. Alliance/SMMRI

Identification of Potential Energy Efficiency Improvement Packages. Nexant, Inc. (February 2003).

Improving Energy Efficiency in Residential and Public Buildings in Lithuania: the Energy Efficiency Housing Pilot Project. Housing and Urban Development Foundation, Lithuania.

Serbian Financial Institutions Willingness to Participate in the Residential Energy Efficiency Fund, July 2003. Alliance to Save Energy.

Survey on Residential Buildings. SMMRI, (December 2002).

WB/ SEEA Energy Efficiency Fund - Residential Questionnaire (Basic Report). April 2003. Alliance/SMMRI.

Appendix B Investment Case Studies

In 2002, energy audits were conducted at numerous residential buildings in Serbia. The purpose of the audits was to collect data on energy consumption at typical residential buildings, in particular, relating to winter heating. The data that was collected formed the basis of recommendations on priority energy efficiency measures that can help reduce the overall level energy consumption at residential buildings. Energy savings calculations for energy efficiency measures were made based on the results of the audits and investment costs for projects were obtained from Serbian contractors and equipment suppliers.

The example projects presented below, Cases A through E, involve priority energy efficiency measures that can generate economic savings for residential owners and involve the use of proven technologies. Cases A through C involve the implementation of projects at a typical residential building that has five floors and 11 individual flats while Cases D through E are assumed to be implemented at single family home buildings.

These cases are intended to serve as illustrative examples of the types of projects that the Fund could support. Other combinations of cost-effective energy efficiency improvements are possible. However, analyses of energy audits indicate that Cases A to F contain some of the most attractive types of projects at residential facilities. Further, according to the results of SMMRI's *Survey on Residential Buildings*, there is a large potential for replicating these projects throughout the country's 83,889 electrically heated residential buildings (representing almost 20% of total urban/suburban residences). 22,398 of the electric heated buildings are single-family homes (i.e., similar to those in Cases D - F) and 66,441 are multifamily residential buildings (i.e., similar to those in Cases A - C).

Case Study A: Conversion of a Residential Building from Electric Heat to District Heating

Project Summary: This example project involves converting a residential building from electric heat to district heating. This project involves the removal of existing electric space heaters and the installation of new radiators and hot water piping. The newly installed piping in the building would be connected to the municipal district heating system. Hot water from the municipal district heating company would then be circulated to the new radiators.

Total Project Cost: The total investment cost for this example district heating conversion project in this typical residential building (roughly 670 square meters with 11 flats) is approximately CSD 1,482,833 (includes a 10% contingency plus interest during construction-IDC).[15] This cost estimate includes all equipment, engineering & design, and installation for the project. It is assumed that it will take 2 months to complete the project.

[15] For all case studies, investment costs are based on quotes received from local equipment suppliers and vendors in Serbia. Cost estimates include all equipment, design, and installation expenses—including network connections in the case of fuel conversion projects.

Annual Savings: The implementation of this project would avoid the annual use of approximately 150,000 kWh. The annual monetary savings are CSD 561,628 (total savings for the residential building from converting to district heating).

Total Investment (In CSD)	Cost Savings (In CSD/Year)	Payback Period (In Years)
1,482,833	561,628	2.64

Case Study B: Conversion of a Residential Building from Electric Heat to Gas Heating

Project Summary: This project example involves the conversion of an electric heat system to natural gas heating at a residential building. Natural gas is becoming more available in Serbia and can be used as a fuel for a boiler system. Compared to electric heating options, natural gas-based systems can significantly reduce a building's annual energy cost. This project involves the removal of existing electric space heaters. In place of the old electric system, hot water piping, radiators, a circulating pump, and a boiler would be installed in the building. Gas piping would then be installed to connect the boiler to the gas network. The boiler would then produce hot water that is distributed throughout the building.

Total Project Cost: The total investment cost for this project is approximately CSD 1,212,858 (a 10% contingency and IDC is added to the total project cost). This cost is based on the assumption that the building is a typical residential building (670 square meters, 11 flats). The project will take roughly 3 months to complete. This includes all equipment, engineering & design, and installation.

Annual Savings: The conversion of this residential building to natural gas would result in an annual cost savings of CSD 772,239.

Total Investment (In CSD)	Cost Savings (In CSD/Year)	Payback Period (In Years)
1,212,858	772,239	1.57

Case Study C: Energy Efficiency Improvement Package at a Residential Building

Project Summary: Residential buildings in Serbia are poorly insulated, and generally very energy inefficient. This example project involves the implementation of a package of energy efficiency improvements at a residential building that uses an electric heating system. It is assumed that this project is implemented in a typical residential building (670 square meters, 11 flats). The package for this project consists of the following items: roof insulation, wall insulation, weather-stripping, basement ceiling insulation, and basement wall insulation.

Total Project Cost: The total investment cost for this project is approximately CSD 705,020 (includes 10% contingency and IDC). The project will take 3 months to complete.

Annual Savings: The estimated total annual electricity savings from this project are 44,075 kWh (taking into account interactions between the different energy efficiency measures). Annual monetary savings for this project are approximately CSD 240,000.

Residential Package	Investment Cost (in CSD)	Savings (kWh/Year)	Cost Savings (in CSD)	Payback (in Years)
Roof Insulation	130,104	15,825	87,038	1.5
Wall Insulation	380,800	22,800	125,400	3.0
Weather-stripping	2,785	671	3,691	0.8
Basement Wall Insulation	26,397	1,881	10,346	2.5
Basement Ceiling Insulation	91,963	7,921	43,565	2.1
10% contingency and IDC	72,971			
TOTAL	**705,020**	**44,075**	**242,411**	**2.91**

Case Study D: Conversion of a Single Family Home from Electric Heat to District Heating

Project Summary: This example project involves converting a typical single family home (roughly 80 square meters) from electric heat to district heating. Specifically, existing electric space heaters in the single-family home will be removed and replaced with new radiators and hot water piping that connects the building to the municipal district heating system. Hot water from the district heating company will then be circulated to the new radiators.

Total Project Cost: The total investment cost for this example project is approximately CSD 96,000 (includes a 10% contingency plus interest during construction). This cost estimate includes all equipment, engineering & design, and installation for the project. It is assumed that it will take 2 months to complete the project (i.e., construction period).

Annual Savings: The annual monetary savings for this example project are CSD 77,792.

	Total Investment (In CSD)	Cost Savings (In CSD/Year)	Payback Period (In Years)
District Heating Connection	96,377	77,792	1.2

Case Study E: Conversion of a Single Family Home from Electric Heat to Natural Gas Heating

Project Summary: This example project involves the conversion of a typical single family home from an electric to natural gas heating system. This project involves replacing the existing electric system with hot water piping, radiators, a circulating pump, and a boiler. Gas piping would then be installed to connect the boiler to the gas network that will produce hot water that is distributed throughout the home.

Total Project Cost: The total investment cost for project is approximately CSD 170,000 (10% contingency and IDC is added to the total project cost). Cost estimates for this example project assume the building is a typical single family home (80 square meters). The project will take 3 months to complete, including all engineering & design and installation.

Annual Savings: The annual cost savings of this example project are CSD 81,293.

	Total Investment (In CSD)	Cost Savings (In CSD/Year)	Payback Period (In Years)
District Heating Connection	169,142	81,293	2.1

Case Study F: Energy Efficiency Improvement Package at a Single Family Home

Project Summary: This example project involves the implementation of a package of energy efficiency improvements at a single family home that currently uses an electric heating system. The package for this project consists of the following main items: roof insulation, wall insulation, and weather-stripping.

Total Project Cost: The total investment cost for this project is approximately CSD 128,000 and it will take 3 months to complete (including engineering & design and installation).

Annual Savings: The estimated annual electricity savings from this project are 11,467 kWh. This estimate takes into account interactions between different energy efficiency measures. Annual monetary savings for this project are approximately CSD 63,000.

Residential Package	Investment Cost (in CSD)	Savings (kWh/Year)	Cost Savings (in CSD)	Payback (in Years)
Roof Insulation	74,880	9,120	50,160	1.5
Wall Insulation	38,080	2,280	12,540	3.0
Weather-stripping	279	67	369	0.8
10% contingency and IDC	14,451			
TOTAL	**127,690**	**11,467**	**63,069**	**2.0**

Appendix C Sustainable Guarantee Definition and Draft Procedures

Definition of Borrower Default

Borrower default is defined as the borrower's failure to make two consecutive principle and interest payments on a loan based on semi-annual payments. For loans with monthly, or quarterly payment terms, the borrower's failure to make payments within a twelve-month period would constitute default.

Notice of Borrower Delinquency

The Participating Financial Institution ("PFI") must notify the Fund in writing of any borrower delinquency or payment failure within 60 days after first payment due date. Upon event of default as defined above, the PFI may file for payment from the Fund.

Rescheduling of Borrower Payment Terms

Prior to submitting a claim for payment under the Sustainable Guarantee Facility, the PFI and the Fund will explore the possibility of rescheduling the borrower's loan to enable the loan to be paid. Any consideration of rescheduling must be supported by a written request from the borrower and accompanied by an explanation and appropriate supporting documentation indicating how the additional time will enable the borrower to repay the loan.

Eligibility Criteria for Participating Banks

The following set of preliminary eligibility criteria could used to determine the suitability of banks as participating financial institutions for the Fund:

1. The banks must have an acceptable audit report that covers one full year of operations, incorporates a portfolio review, and is prepared by an internationally recognized audit firm in accordance with International Accounting Standards (IAS);
2. The bank must have been in existence and have produced operating results for a minimum of two years;
3. The bank must provide a Certificate of Compliance from the National Bank of Yugoslavia stating that it has a valid banking license (listing the type and date of license);
4. The bank is in general compliance with all relevant banking laws and regulations;
5. The bank must have minimum assets, as defined under IAS, equal to USD 25 million;
6. The bank must have minimum equity capital, or net worth assets minus liabilities, as defined under IAS, in an amount equivalent to USD 2 million;
7. The bank must have minimum BIS risk weighted capital as defined under IAS adequacy ratio of 6% by year-end 2002, 7% by year-end 2003 and 8% by year-end 2004; and

8. The bank must have an exposure to one borrower (as a % of its IAS equity capital) of no more than 35% by year-end 2002, 30% by year-end 2003, and 25% by year-end 2004.

Appendix D Summary of International Experience

This section provides an overview of various approaches that have been used to develop energy efficiency funds worldwide. The examples listed below could serve as potential guidelines for the application of the sustainable guarantee option, with adaptations based on the realities of the local market in Serbia for energy efficiency.

EFRIENDS – Sri Lanka

EFRIENDS was designed as an environmentally friendly solutions fund for industrial firms to provide technical assistance and low-cost loans for waste minimization, resource recovery and savings (including energy efficiency), and pollution control and abatement. *EFRIENDS* was funded by the Japanese Bank for International Cooperation ("JBIC") and administered by Sri Lanka's National Development Bank. Sri Lankan banks participating in *EFRIENDS* include Hatton National Bank, Commercial Bank, DFCC Bank, Sampath Bank, and Seylan Bank. Loans offered under this program included the following conditions:

- Loans can be obtained for up to 100% of the cost of a project;
- Nominal interest rate of 8.5% (0% real interest rate);
- Repayment terms of 10 years (inclusive of a maximum grace period of 2 years); and
- Security for the loan normally a mortgage over the project assets.

EFRIENDS also provided support (via low interest loans) for technical assistance needed to implement a project. Technical assistance loans included the following conditions:

- Interest free loan covering services directly related to the assessment of energy efficiency measures as well as design, supervision, installation and commissioning of equipment;
- Reimbursement of 75% of the cost subject to a maximum of Rs. 750,000;
- Maximum repayment period of 5-years including a 1-year grace period; and
- Only available to firms that also obtained the project loan

The benefits of the *EFRIENDS* loan scheme and that it coupled attractive interest rates with long loan repayment terms. In addition, it offered 100% financing which was an attractive feature since most banks typically require a 30-40% front-end equity contribution on projects. However, the program encountered problems, including delays in gaining approvals for loan applications, inability of the program to make new loans once its financial resources were fully loaned out, and lenders required collateral from borrowers (mortgage over the assets).

Global Environment Facility (GEF) Programs: Hungary and China examples

The World Bank, through the Global Environment Facility, has supported a number of successful energy efficiency guarantee programs in other countries. Summarized below are two example GEF initiatives that were implemented in Hungary and China.

Hungary

In Hungary, the *Energy Efficiency Guarantee Program* provided loan guarantees to Hungarian financial institutions for both individual loans as well as a portfolio guarantee that provided a blanket guarantee to help facilitate small loans. This program was implemented by the International Finance Corporation (IFC) and the GEF. Under this Facility, the GEF contributed a USD five million grant with the IFC contributing another USD eight million in reserves. The Facility then used this capital to create a two-tiered Guarantee Facility Agreement with a local financial institution broken into a *Transaction Guarantee* and a *Portfolio Guarantee*, as follows:

- The *Transaction Guarantee* was provided to the local financial institution for repayment of energy efficiency loans that it made to three classes or borrowers: 1) end-users who received loans directly from the financial institution; 2) leasing companies who used the loans from the financial institution to offer lease financing to end-users, and 3) ESCOs who used the loans to finance energy service agreements with end-users.
- The *Portfolio Guarantee* was made to the local financial institution for small energy efficiency loans and leases to end-users. The Program provided a repayment guarantee, and co-funded a loan loss reserve, for loans comprising the portfolio.

China

In China, the *Energy Efficiency Guarantee Facility* offered co-financing for loan loss reserves with a Chinese guarantee agency that provided loans guarantees to Chinese financial institutions that in turn provided loans for energy efficiency projects. Under this structure, the GEF offers co-financing for loan loss reserves with a Local Guarantee Agency in China, and the GEF agrees to cover first losses under the *Facility.* The Local Guarantee Agency has a *Guarantee Facility Agreement* in place with a Local Financial Institution who makes energy efficiency project loans to three classes of borrowers as follows: leasing companies, who structure equipment lease financing to end-users; end-users; and, energy management companies who finance Energy Services Agreements with end-users.

USAID Development Credit Authority (Bulgaria example)

Development Credit Authority (DCA) is a market-based credit enhancement mechanism that offers a flexible and effective tool for attracting private investment and mobilizing private capital in support of development objectives. DCA facilities are typically 50% principal guarantees, used when USAID overseas missions decide that a credit enhancement will better serve local development interests than the more traditional grant programs.

The DCA provides loan guarantees covering up to 50% of a lenders commercial risk on a project or portfolio of projects. Eligible borrowers may be private-sector firms, municipalities, and sub-sovereign entities if the central government owns less than 25%; DCA cannot work with sovereign government entities. The term of the DCA Guarantee may extend to 20-years, however, most Guarantees have been issued for less than 10-year terms.

USAID/Bulgaria has successfully funded two energy efficiency activities that have helped to develop a groundswell of interest in among local municipalities. Municipalities have organized themselves, with USAID assistance, to form the Municipal Energy Efficiency Network (MEEN) that is linked to other international energy efficiency organizations in Central and Eastern Europe. Despite the importance of successfully mobilizing key energy efficiency borrowers, this activity did not address concerns of local banks relating perceptions of credit risks and inadequate collateral on the part of municipalities. Therefore, DCA entered into the market to help remove this barrier by providing the United Bulgarian Bank (UBB), a privately-owned Bulgarian bank, with a loan portfolio guarantee. Through this arrangement, USAID partially guarantees a series of loans made to various municipalities and some private sector enterprises to finance revenue-generating energy efficiency projects.

Through this initiative USAID will mobilize $6,250,000 in local financial resources at a cost of $425,000 to the US Government. Financing is complemented by technical assistance provided to municipalities under the Municipal Energy Efficiency Program (MEEP) to aid them in designing and developing bankable projects. Since the inception of this activity in late 1999, ten loans have been financed by UBB under the DCA guarantee amounting to about $1.6 million. The successful implementation of this activity has demonstrated that longer-term project financing is indeed an attractive investment option for commercial banks in Bulgaria. UBB has, in fact, indicated that positive experience with certain first-time borrowers has prompted it to expand its credit exposure to these entities.

Energy Efficiency Housing Project – Lithuania

The Energy Efficiency Housing Project (EEHP) was carried out during the period of 1996 to 2001 to help improve the efficiency of energy use at multifamily residential buildings that are managed by Homeowner Associations (HOAs). The project was implemented with the support of the World Bank, Danish Ministry of Housing and Urban Affairs, the Dutch Ministry of Economics, the Lithuanian Housing and Urban Development Foundation and the Lithuanian Ministry of Finance.

Under EEHP, financing was made available to HOAs though local banks at the following favorable terms: 11% annual interest rate with repayment periods stretching out to ten years. Banks required borrowers to make 10% down payment on a project. Loan repayment was shared between homeowners (typically according to apartment size) with banks accepting early debt payments. In 1999, the state government offered an additional incentive of a 30% grant on the principal of a loan, which significantly increased local demand for financing.

EEHP also established a local support network consisting of five advisory centers that provided a range of free technical, legal, and financial services needed to develop projects. Further, EEHP launched information campaigns that increased local awareness of the benefits of energy efficiency, thereby stimulating demand for energy efficiency investments.

In total, EEHP activities enabled 207 HOAs and 25 owners of single family homes to implement energy efficiency packages in their buildings (approximately USD 8.5 million in residential

energy efficiency investments).[16] Other key outcomes of EEHP include the demonstration that homeowners can overcome some of the barriers to communal investments if an adequate legal framework is in place to form associations, make majority decisions, and ensure enforcement of individual obligations.

Export Credit Agency Loan Guarantee Programs

The loan guarantee mechanism has been used by most of the world's export credit agencies in one form or another. This includes loan guarantee programs that were developed by the Export-Import Bank of the United States. For the fiscal year 2002, the Export-Import Bank of the United States authorized over U.S.$10 billion in export financing with just 10 direct loans out of approximately 2,500 authorizations, the remainder being either loan guarantees or insurance to banks. Other international export credit agencies that regularly provide loan guarantees include Hermes (Germany) and Coface (France).

KfW – Promotion and Development of Small and Medium Sector Enterprise

Through the support of the German Development Bank Kreditanstalt fur Wiederaufbau ("KfW"), an initial DM 20 million financing was extended from the Government of Germany to the Government of Bangladesh to promote the establishment or expansion of efficient, financially viable and ecologically sound small enterprises in Bangladesh with fixed assets of less than Taka 50 million. The primary implementing financial institution under this Program was United Leasing Company Ltd. ("ULC"). Under the Program, ULC provided medium- and long-term lease financing to private-sector small enterprises for whom KfW had given prior approval, and then received a reimbursement of the lease from the KfW. The leases were structured with "affordable" interest rates, given the low interest rates supplied by KfW. Key measures of success for this program include:

- At least 80% of the enterprises financed from KfW funds operated profitably after the second year of operation for new products and for existing projects one year after modernization or replacement of the machinery;
- At least 85% of the Lessees met their payment obligations no later than 6 months after falling due;
- The bad debts from projects financed from KfW funds would not exceed 5% of the total outstanding value;
- At least 250 jobs were created or safeguarded.

KfW termed the initial Program a "remarkable success" and has expressed an interest in continuation of the Program with an additional credit line.

[16] *Improving energy efficiency in residential and public buildings in Lithuania: EEHP.* Housing and Urban Development Foundation, Lithuania.

Appendix E Economic and Financial Analysis Assumptions

This appendix provides further information on the assumptions that were used to evaluate the economic and financial viability of the energy efficiency case studies. Listed below is a summary of some of the key analysis assumptions:

- *Capital Structure*: It was assumed that all case studies were financed using 100% debt.
- *Cash Flow Stream*: Each project is evaluated based on a 10-year cash flow analysis period. Cash flows are stated in nominal terms and reflect the annual avoided cost (i.e., monetary savings) that would be generated following the implementation of each project. It was assumed that there would be no increase in local fuel and electricity prices over this period (this assumption reflects both the political challenges in raising energy prices in the near term and the difficulty of predicting the timing of any such changes).
- *Loan Assumptions*: For the Base Case scenario, an average loan term was used that includes an annual interest rate of 15% and a 3-year repayment period. As part of the analysis of the sustainable guarantee option, potential loan terms were adjusted to reflect the benefits of the proposed credit line and 50% loan guarantee. For SG Scenario 1, loan terms included repayment periods ranging from 3-5 years with an annual interest rate of 7.5%. For SG Scenario 2, loan terms included repayment periods ranging from 3-5 years with an annual interest rate of 5%. In all cases, interest rates were stated in nominal terms. For the purposes of this illustrative analysis, it was also assumed that interest rates would remain at their current levels since changes in actual rates often have a long lag time.
- *Annual Income of Example Residential Borrowers*. It was assumed that the annual income of potential borrowers for the case study projects was equal to the CSD 100,320 median annual income of respondents to the Alliance's residential survey.

A cash flow statement for each case study is attached to this appendix for the following scenarios: base case, SG Scenario 1 (five-year term) and SG Scenario 2 (five-year term). The cash flow statement presents the results of each case study at both the project (aggregated) and individual residence owner/borrower level. For Cases A to C, the project level results are divided by 11 (the assumed number of flats in a building) to calculate individual borrower results. For single family home cases, the project level and individual residence owner results are the same.

Project Cash Flow Statement (in CSD)

Project Cash Flow Statement

A

***** BASE CASE SCENARIO *****

	Year End 2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Project Level - Aggregated Cash Flow												
Plus: Project Revenues[1]	0	561,628	561,628	561,628	561,628	561,628	561,628	561,628	561,628	561,628	561,628	0
Less: Project Operating Expenses[2]	0	0	0	0	0	0	0	0	0	0	0	0
Less: Project Debt Repayment	0	654,763	654,763	654,763	0	0	0	0	0	0	0	0
Operating Cash Flow for Total Project	0	(93,135)	(93,135)	(93,135)	561,628	561,628	561,628	561,628	561,628	561,628	561,628	0
Residence Owner Level - Individual Borrower's Cash Flow												
Plus: Annual Savings[1]	0	51,057	51,057	51,057	51,057	51,057	51,057	51,057	51,057	51,057	51,057	0
Less: Operating Expenses[2]	0	0	0	0	0	0	0	0	0	0	0	0
Less: Debt Repayment	0	59,524	59,524	59,524	0	0	0	0	0	0	0	0
Operating Cash Flow for Individual Tenant	0	(8,467)	(8,467)	(8,467)	51,057	51,057	51,057	51,057	51,057	51,057	51,057	0
Key Results												
Residence Owner Level												
Debt Payment as % of Total Income	0%	59%	59%	59%	0%	0%	0%	0%	0%	0%	0%	0%
Net Cash Flow as % of Total Income	0%	-8%	-8%	-8%	0%	0%	0%	0%	0%	0%	0%	0%

Project Level	
NPV of Total Project at 18% Discount Rate	1,100,372
Simple Payback Period	2.66

Notes

1) Includes all project-related savings (i.e., avoided annual energy costs)

2) Includes all annual fuel and non-fuel O&M expenses (if applicable)

Project Cash Flow Statement (in CSD)

Project Cash Flow Statement

B

***** BASE CASE SCENARIO *****

	Year End 2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Project Level - Aggregated Cash Flow												
Plus: Project Revenues[1]	0	772,239	772,239	772,239	772,239	772,239	772,239	772,239	772,239	772,239	772,239	0
Less: Project Operating Expenses[2]	0	0	0	0	0	0	0	0	0	0	0	0
Less: Project Debt Repayment	0	536,996	536,996	536,996	0	0	0	0	0	0	0	0
Operating Cash Flow for Total Project	0	235,243	235,243	235,243	772,239	772,239	772,239	772,239	772,239	772,239	772,239	0
Residence Owner Level - Individual Borrower's Cash Flow												
Plus: Annual Savings[1]	0	70,204	70,204	70,204	70,204	70,204	70,204	70,204	70,204	70,204	70,204	0
Less: Operating Expenses[2]	0	0	0	0	0	0	0	0	0	0	0	0
Less: Debt Repayment	0	48,818	48,818	48,818	0	0	0	0	0	0	0	0
Operating Cash Flow for Individual Tenant	0	21,386	21,386	21,386	70,204	70,204	70,204	70,204	70,204	70,204	70,204	0
Key Results												
Residence Owner Level												
Debt Payment as % of Total Income	0%	49%	49%	49%	0%	0%	0%	0%	0%	0%	0%	0%
Net Cash Flow as % of Total Income	0%	21%	21%	21%	0%	0%	0%	0%	0%	0%	0%	0%

Project Level	
NPV of Total Project at 18% Discount Rate	2,302,933
Simple Payback Period	1.59

Notes

1) Includes all project-related savings (i.e., avoided annual energy costs)

2) Includes all annual fuel and non-fuel O&M expenses (if applicable)

Project Cash Flow Statement

C

***** BASE CASE SCENARIO *****

	Year End 2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Project Level - Aggregated Cash Flow												
Plus: Project Revenues[1]	0	242,411	242,411	242,411	242,411	242,411	242,411	242,411	242,411	242,411	242,411	0
Less: Project Operating Expenses[2]	0	0	0	0	0	0	0	0	0	0	0	0
Less: Project Debt Repayment	0	312,149	312,149	312,149	0	0	0	0	0	0	0	0
Operating Cash Flow for Total Project	0	(69,738)	(69,738)	(69,738)	242,411	242,411	242,411	242,411	242,411	242,411	242,411	0
Residence Owner Level - Individual Borrower's Cash Flow												
Plus: Annual Savings[1]	0	22,037	22,037	22,037	22,037	22,037	22,037	22,037	22,037	22,037	22,037	0
Less: Operating Expenses[2]	0	0	0	0	0	0	0	0	0	0	0	0
Less: Debt Repayment	0	28,377	28,377	28,377	0	0	0	0	0	0	0	0
Operating Cash Flow for Individual Tenant	0	(6,340)	(6,340)	(6,340)	22,037	22,037	22,037	22,037	22,037	22,037	22,037	0
Key Results												
Residence Owner Level												
Debt Payment as % of Total Income	0%	28%	28%	28%	0%	0%	0%	0%	0%	0%	0%	0%
Net Cash Flow as % of Total Income	0%	-6%	-6%	-6%	0%	0%	0%	0%	0%	0%	0%	0%

Project Level	
NPV of Total Project at 18% Discount Rate	410,718
Simple Payback Period	2.94

Notes

1) Includes all project-related savings (i.e., avoided annual energy costs)

2) Includes all annual fuel and non-fuel O&M expenses (if applicable)

Project Cash Flow Statement (in CSD)

Project Cash Flow Statement

D

*** BASE CASE SCENARIO ***

	Year End 2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Project Level - Aggregated Cash Flow												
Plus: Project Revenues[1]	0	77,792	77,792	77,792	77,792	77,792	77,792	77,792	77,792	77,792	77,792	0
Less: Project Operating Expenses[2]	0	0	0	0	0	0	0	0	0	0	0	0
Less: Project Debt Repayment	0	42,211	42,211	42,211	0	0	0	0	0	0	0	0
Operating Cash Flow for Total Project	0	35,581	35,581	35,581	77,792	77,792	77,792	77,792	77,792	77,792	77,792	0
Residence Owner Level - Individual Borrower's Cash Flow												
Plus: Annual Savings[1]	0	77,792	77,792	77,792	77,792	77,792	77,792	77,792	77,792	77,792	77,792	0
Less: Operating Expenses[2]	0	0	0	0	0	0	0	0	0	0	0	0
Less: Debt Repayment	0	42,211	42,211	42,211	0	0	0	0	0	0	0	0
Operating Cash Flow for Individual Tenant	0	35,581	35,581	35,581	77,792	77,792	77,792	77,792	77,792	77,792	77,792	0
Key Results												
Residence Owner Level												
Debt Payment as % of Total Income	0%	42%	42%	42%	0%	0%	0%	0%	0%	0%	0%	0%
Net Cash Flow as % of Total Income	0%	35%	35%	35%	0%	0%	0%	0%	0%	0%	0%	0%

Project Level	
NPV of Total Project at 18% Discount Rate	257,826
Simple Payback Period	1.24

Notes

1) Includes all project-related savings (i.e., avoided annual energy costs)

2) Includes all annual fuel and non-fuel O&M expenses (if applicable)

Project Cash Flow Statement

E

***** BASE CASE SCENARIO *****

	Year End 2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Project Level - Aggregated Cash Flow												
Plus: Project Revenues[1]	0	81,293	81,293	81,293	81,293	81,293	81,293	81,293	81,293	81,293	81,293	0
Less: Project Operating Expenses[2]	0	0	0	0	0	0	0	0	0	0	0	0
Less: Project Debt Repayment	0	74,080	74,080	74,080	0	0	0	0	0	0	0	0
Operating Cash Flow for Total Project	0	7,213	7,213	7,213	81,293	81,293	81,293	81,293	81,293	81,293	81,293	0
Residence Owner Level - Individual Borrower's Cash Flow												
Plus: Annual Savings[1]	0	81,293	81,293	81,293	81,293	81,293	81,293	81,293	81,293	81,293	81,293	0
Less: Operating Expenses[2]	0	0	0	0	0	0	0	0	0	0	0	0
Less: Debt Repayment	0	74,080	74,080	74,080	0	0	0	0	0	0	0	0
Operating Cash Flow for Individual Tenant	0	7,213	7,213	7,213	81,293	81,293	81,293	81,293	81,293	81,293	81,293	0
Key Results												
Residence Owner Level												
Debt Payment as % of Total Income	0%	74%	74%	74%	0%	0%	0%	0%	0%	0%	0%	0%
Net Cash Flow as % of Total Income	0%	7%	7%	7%	0%	0%	0%	0%	0%	0%	0%	0%

Project Level	
NPV of Total Project at 18% Discount Rate	204,267
Simple Payback Period	2.08

Notes

1) Includes all project-related savings (i.e., avoided annual energy costs)

2) Includes all annual fuel and non-fuel O&M expenses (if applicable)

Project Cash Flow Statement (in CSD)

Project Cash Flow Statement

F

*** BASE CASE SCENARIO ***

	Year End 2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Project Level - Aggregated Cash Flow												
Plus: Project Revenues[1]	0	68,459	68,459	68,459	68,459	68,459	68,459	68,459	68,459	68,459	68,459	0
Less: Project Operating Expenses[2]	0	0	0	0	0	0	0	0	0	0	0	0
Less: Project Debt Repayment	0	55,925	55,925	55,925	0	0	0	0	0	0	0	0
Operating Cash Flow for Total Project	0	12,534	12,534	12,534	68,459	68,459	68,459	68,459	68,459	68,459	68,459	0
Residence Owner Level - Individual Borrower's Cash Flow												
Plus: Annual Savings[1]	0	68,459	68,459	68,459	68,459	68,459	68,459	68,459	68,459	68,459	68,459	0
Less: Operating Expenses[2]	0	0	0	0	0	0	0	0	0	0	0	0
Less: Debt Repayment	0	55,925	55,925	55,925	0	0	0	0	0	0	0	0
Operating Cash Flow for Individual Tenant	0	12,534	12,534	12,534	68,459	68,459	68,459	68,459	68,459	68,459	68,459	0
Key Results												
Residence Owner Level												
Debt Payment as % of Total Income	0%	56%	56%	56%	0%	0%	0%	0%	0%	0%	0%	0%
Net Cash Flow as % of Total Income	0%	12%	12%	12%	0%	0%	0%	0%	0%	0%	0%	0%

Project Level	
NPV of Total Project at 18% Discount Rate	186,064
Simple Payback Period	1.87

Notes

1) Includes all project-related savings (i.e., avoided annual energy costs)

2) Includes all annual fuel and non-fuel O&M expenses (if applicable)

Project Cash Flow Statement

A

***** SG SCENARIO 1: 5-YEAR TERM*****

	Year End 2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Project Level - Aggregated Cash Flow												
Plus: Project Revenues[1]	0	561,628	561,628	561,628	561,628	561,628	561,628	561,628	561,628	561,628	561,628	0
Less: Project Operating Expenses[2]	0	0	0	0	0	0	0	0	0	0	0	0
Less: Project Debt Repayment	0	366,093	366,093	366,093	366,093	366,093	0	0	0	0	0	0
Operating Cash Flow for Total Project	0	195,535	195,535	195,535	195,535	195,535	561,628	561,628	561,628	561,628	561,628	0
Residence Owner Level - Individual Borrower's Cash Flow												
Plus: Annual Savings[1]	0	51,057	51,057	51,057	51,057	51,057	51,057	51,057	51,057	51,057	51,057	0
Less: Operating Expenses[2]	0	0	0	0	0	0	0	0	0	0	0	0
Less: Debt Repayment	0	33,281	33,281	33,281	33,281	33,281	0	0	0	0	0	0
Operating Cash Flow for Individual Tenant	0	17,776	17,776	17,776	17,776	17,776	51,057	51,057	51,057	51,057	51,057	0
Key Results												
Residence Owner Level												
Debt Payment as % of Total Income	0%	33%	33%	33%	33%	33%	0%	0%	0%	0%	0%	0%
Net Cash Flow as % of Total Income	0%	18%	18%	18%	18%	18%	0%	0%	0%	0%	0%	0%

Project Level	
NPV of Total Project at 18% Discount Rate	1,379,168
Simple Payback Period	2.64

Notes

1) Includes all project-related savings (i.e., avoided annual energy costs)

2) Includes all annual fuel and non-fuel O&M expenses (if applicable)

Project Cash Flow Statement

B

***** SG SCENARIO 1: 5-YEAR TERM*****

	Year End 2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Project Level - Aggregated Cash Flow												
Plus: Project Revenues[1]	0	772,239	772,239	772,239	772,239	772,239	772,239	772,239	772,239	772,239	772,239	0
Less: Project Operating Expenses[2]	0	0	0	0	0	0	0	0	0	0	0	0
Less: Project Debt Repayment	0	299,326	299,326	299,326	299,326	299,326	0	0	0	0	0	0
Operating Cash Flow for Total Project	0	472,913	472,913	472,913	472,913	472,913	772,239	772,239	772,239	772,239	772,239	0
Residence Owner Level - Individual Borrower's Cash Flow												
Plus: Annual Savings[1]	0	70,204	70,204	70,204	70,204	70,204	70,204	70,204	70,204	70,204	70,204	0
Less: Operating Expenses[2]	0	0	0	0	0	0	0	0	0	0	0	0
Less: Debt Repayment	0	27,211	27,211	27,211	27,211	27,211	0	0	0	0	0	0
Operating Cash Flow for Individual Tenant	0	42,992	42,992	42,992	42,992	42,992	70,204	70,204	70,204	70,204	70,204	0
Key Results												
Residence Owner Level												
Debt Payment as % of Total Income	0%	27%	27%	27%	27%	27%	0%	0%	0%	0%	0%	0%
Net Cash Flow as % of Total Income	0%	43%	43%	43%	43%	43%	0%	0%	0%	0%	0%	0%

Project Level	
NPV of Total Project at 18% Discount Rate	2,534,465
Simple Payback Period	1.57

Notes

1) Includes all project-related savings (i.e., avoided annual energy costs)

2) Includes all annual fuel and non-fuel O&M expenses (if applicable)

Project Cash Flow Statement

C

***** SG SCENARIO 1: 5-YEAR TERM*****

	Year End 2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Project Level - Aggregated Cash Flow												
Plus: Project Revenues[1]	0	242,411	242,411	242,411	242,411	242,411	242,411	242,411	242,411	242,411	242,411	0
Less: Project Operating Expenses[2]	0	0	0	0	0	0	0	0	0	0	0	0
Less: Project Debt Repayment	0	173,995	173,995	173,995	173,995	173,995	0	0	0	0	0	0
Operating Cash Flow for Total Project	0	68,416	68,416	68,416	68,416	68,416	242,411	242,411	242,411	242,411	242,411	0
Residence Owner Level - Individual Borrower's Cash Flow												
Plus: Annual Savings[1]	0	22,037	22,037	22,037	22,037	22,037	22,037	22,037	22,037	22,037	22,037	0
Less: Operating Expenses[2]	0	0	0	0	0	0	0	0	0	0	0	0
Less: Debt Repayment	0	15,818	15,818	15,818	15,818	15,818	0	0	0	0	0	0
Operating Cash Flow for Individual Tenant	0	6,220	6,220	6,220	6,220	6,220	22,037	22,037	22,037	22,037	22,037	0
Key Results												
Residence Owner Level												
Debt Payment as % of Total Income	0%	16%	16%	16%	16%	16%	0%	0%	0%	0%	0%	0%
Net Cash Flow as % of Total Income	0%	6%	6%	6%	6%	6%	0%	0%	0%	0%	0%	0%

Project Level

NPV of Total Project at 18% Discount Rate	545,305
Simple Payback Period	2.90

Notes

1) Includes all project-related savings (i.e., avoided annual energy costs)

2) Includes all annual fuel and non-fuel O&M expenses (if applicable)

Project Cash Flow Statement

D

***** SG SCENARIO 1: 5-YEAR TERM*****

	Year End 2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Project Level - Aggregated Cash Flow												
Plus: Project Revenues[1]	0	77,792	77,792	77,792	77,792	77,792	77,792	77,792	77,792	77,792	77,792	0
Less: Project Operating Expenses[2]	0	0	0	0	0	0	0	0	0	0	0	0
Less: Project Debt Repayment	0	23,601	23,601	23,601	23,601	23,601	0	0	0	0	0	0
Operating Cash Flow for Total Project	0	54,191	54,191	54,191	54,191	54,191	77,792	77,792	77,792	77,792	77,792	0
Residence Owner Level - Individual Borrower's Cash Flow												
Plus: Annual Savings[1]	0	77,792	77,792	77,792	77,792	77,792	77,792	77,792	77,792	77,792	77,792	0
Less: Operating Expenses[2]	0	0	0	0	0	0	0	0	0	0	0	0
Less: Debt Repayment	0	23,601	23,601	23,601	23,601	23,601	0	0	0	0	0	0
Operating Cash Flow for Individual Tenant	0	54,191	54,191	54,191	54,191	54,191	77,792	77,792	77,792	77,792	77,792	0
Key Results												
Residence Owner Level												
Debt Payment as % of Total Income	0%	24%	24%	24%	24%	24%	0%	0%	0%	0%	0%	0%
Net Cash Flow as % of Total Income	0%	54%	54%	54%	54%	54%	0%	0%	0%	0%	0%	0%

Project Level	
NPV of Total Project at 18% Discount Rate	275,799
Simple Payback Period	1.23

Notes

1) Includes all project-related savings (i.e., avoided annual energy costs)

2) Includes all annual fuel and non-fuel O&M expenses (if applicable)

Project Cash Flow Statement

E

***** SG SCENARIO 1: 5-YEAR TERM*****

	Year End 2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Project Level - Aggregated Cash Flow												
Plus: Project Revenues[1]	0	81,293	81,293	81,293	81,293	81,293	81,293	81,293	81,293	81,293	81,293	0
Less: Project Operating Expenses[2]	0	0	0	0	0	0	0	0	0	0	0	0
Less: Project Debt Repayment	0	41,293	41,293	41,293	41,293	41,293	0	0	0	0	0	0
Operating Cash Flow for Total Project	0	40,000	40,000	40,000	40,000	40,000	81,293	81,293	81,293	81,293	81,293	0
Residence Owner Level - Individual Borrower's Cash Flow												
Plus: Annual Savings[1]	0	81,293	81,293	81,293	81,293	81,293	81,293	81,293	81,293	81,293	81,293	0
Less: Operating Expenses[2]	0	0	0	0	0	0	0	0	0	0	0	0
Less: Debt Repayment	0	41,293	41,293	41,293	41,293	41,293	0	0	0	0	0	0
Operating Cash Flow for Individual Tenant	0	40,000	40,000	40,000	40,000	40,000	81,293	81,293	81,293	81,293	81,293	0
Key Results												
Residence Owner Level												
Debt Payment as % of Total Income	0%	41%	41%	41%	41%	41%	0%	0%	0%	0%	0%	0%
Net Cash Flow as % of Total Income	0%	40%	40%	40%	40%	40%	0%	0%	0%	0%	0%	0%

Project Level	
NPV of Total Project at 18% Discount Rate	236,207
Simple Payback Period	2.06

Notes

1) Includes all project-related savings (i.e., avoided annual energy costs)

2) Includes all annual fuel and non-fuel O&M expenses (if applicable)

Project Cash Flow Statement (in CSD)

Project Cash Flow Statement

F

***** SG SCENARIO 1: 5-YEAR TERM*****

	Year End 2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Project Level - Aggregated Cash Flow												
Plus: Project Revenues[1]	0	68,459	68,459	68,459	68,459	68,459	68,459	68,459	68,459	68,459	68,459	0
Less: Project Operating Expenses[2]	0	0	0	0	0	0	0	0	0	0	0	0
Less: Project Debt Repayment	0	31,173	31,173	31,173	31,173	31,173	0	0	0	0	0	0
Operating Cash Flow for Total Project	0	37,286	37,286	37,286	37,286	37,286	68,459	68,459	68,459	68,459	68,459	0
Residence Owner Level - Individual Borrower's Cash Flow												
Plus: Annual Savings[1]	0	68,459	68,459	68,459	68,459	68,459	68,459	68,459	68,459	68,459	68,459	0
Less: Operating Expenses[2]	0	0	0	0	0	0	0	0	0	0	0	0
Less: Debt Repayment	0	31,173	31,173	31,173	31,173	31,173	0	0	0	0	0	0
Operating Cash Flow for Individual Tenant	0	37,286	37,286	37,286	37,286	37,286	68,459	68,459	68,459	68,459	68,459	0
Key Results												
Residence Owner Level												
Debt Payment as % of Total Income	0%	31%	31%	31%	31%	31%	0%	0%	0%	0%	0%	0%
Net Cash Flow as % of Total Income	0%	37%	37%	37%	37%	37%	0%	0%	0%	0%	0%	0%

Project Level	
NPV of Total Project at 18% Discount Rate	210,177
Simple Payback Period	1.84

Notes

1) Includes all project-related savings (i.e., avoided annual energy costs)

2) Includes all annual fuel and non-fuel O&M expenses (if applicable)

Project Cash Flow Statement (in CSD)

Project Cash Flow Statement

A

***** SG SCENARIO 2: 5-YEAR TERM*****

	Year End 2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Project Level - Aggregated Cash Flow												
Plus: Project Revenues[1]	0	561,628	561,628	561,628	561,628	561,628	561,628	561,628	561,628	561,628	561,628	0
Less: Project Operating Expenses[2]	0	0	0	0	0	0	0	0	0	0	0	0
Less: Project Debt Repayment	0	341,052	341,052	341,052	341,052	341,052	0	0	0	0	0	0
Operating Cash Flow for Total Project	0	220,576	220,576	220,576	220,576	220,576	561,628	561,628	561,628	561,628	561,628	0
Residence Owner Level - Individual Borrower's Cash Flow												
Plus: Annual Savings[1]	0	51,057	51,057	51,057	51,057	51,057	51,057	51,057	51,057	51,057	51,057	0
Less: Operating Expenses[2]	0	0	0	0	0	0	0	0	0	0	0	0
Less: Debt Repayment	0	31,005	31,005	31,005	31,005	31,005	0	0	0	0	0	0
Operating Cash Flow for Individual Tenant	0	20,052	20,052	20,052	20,052	20,052	51,057	51,057	51,057	51,057	51,057	0
Key Results												
Residence Owner Level												
Debt Payment as % of Total Income	0%	31%	31%	31%	31%	31%	0%	0%	0%	0%	0%	0%
Net Cash Flow as % of Total Income	0%	20%	20%	20%	20%	20%	0%	0%	0%	0%	0%	0%

Project Level	
NPV of Total Project at 18% Discount Rate	1,457,476
Simple Payback Period	2.63

Notes

1) Includes all project-related savings (i.e., avoided annual energy costs)

2) Includes all annual fuel and non-fuel O&M expenses (if applicable)

Project Cash Flow Statement

B

***** SG SCENARIO 2: 5-YEAR TERM*****

	Year End 2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Project Level - Aggregated Cash Flow												
Plus: Project Revenues[1]	0	772,239	772,239	772,239	772,239	772,239	772,239	772,239	772,239	772,239	772,239	0
Less: Project Operating Expenses[2]	0	0	0	0	0	0	0	0	0	0	0	0
Less: Project Debt Repayment	0	278,564	278,564	278,564	278,564	278,564	0	0	0	0	0	0
Operating Cash Flow for Total Project	0	493,675	493,675	493,675	493,675	493,675	772,239	772,239	772,239	772,239	772,239	0
Residence Owner Level - Individual Borrower's Cash Flow												
Plus: Annual Savings[1]	0	70,204	70,204	70,204	70,204	70,204	70,204	70,204	70,204	70,204	70,204	0
Less: Operating Expenses[2]	0	0	0	0	0	0	0	0	0	0	0	0
Less: Debt Repayment	0	25,324	25,324	25,324	25,324	25,324	0	0	0	0	0	0
Operating Cash Flow for Individual Tenant	0	44,880	44,880	44,880	44,880	44,880	70,204	70,204	70,204	70,204	70,204	0
Key Results												
Residence Owner Level												
Debt Payment as % of Total Income	0%	25%	25%	25%	25%	25%	0%	0%	0%	0%	0%	0%
Net Cash Flow as % of Total Income	0%	45%	45%	45%	45%	45%	0%	0%	0%	0%	0%	0%

Project Level	
NPV of Total Project at 18% Discount Rate	2,599,390
Simple Payback Period	1.56

Notes

1) Includes all project-related savings (i.e., avoided annual energy costs)

2) Includes all annual fuel and non-fuel O&M expenses (if applicable)

Project Cash Flow Statement (in CSD)

Project Cash Flow Statement

C

***** SG SCENARIO 2: 5-YEAR TERM*****

	Year End 2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Project Level - Aggregated Cash Flow												
Plus: Project Revenues[1]	0	242,411	242,411	242,411	242,411	242,411	242,411	242,411	242,411	242,411	242,411	0
Less: Project Operating Expenses[2]	0	0	0	0	0	0	0	0	0	0	0	0
Less: Project Debt Repayment	0	161,926	161,926	161,926	161,926	161,926	0	0	0	0	0	0
Operating Cash Flow for Total Project	0	80,485	80,485	80,485	80,485	80,485	242,411	242,411	242,411	242,411	242,411	0
Residence Owner Level - Individual Borrower's Cash Flow												
Plus: Annual Savings[1]	0	22,037	22,037	22,037	22,037	22,037	22,037	22,037	22,037	22,037	22,037	0
Less: Operating Expenses[2]	0	0	0	0	0	0	0	0	0	0	0	0
Less: Debt Repayment	0	14,721	14,721	14,721	14,721	14,721	0	0	0	0	0	0
Operating Cash Flow for Individual Tenant	0	7,317	7,317	7,317	7,317	7,317	22,037	22,037	22,037	22,037	22,037	0
Key Results												
Residence Owner Level												
Debt Payment as % of Total Income	0%	15%	15%	15%	15%	15%	0%	0%	0%	0%	0%	0%
Net Cash Flow as % of Total Income	0%	7%	7%	7%	7%	7%	0%	0%	0%	0%	0%	0%

Project Level	
NPV of Total Project at 18% Discount Rate	583,045
Simple Payback Period	2.89

Notes

1) Includes all project-related savings (i.e., avoided annual energy costs)

2) Includes all annual fuel and non-fuel O&M expenses (if applicable)

Project Cash Flow Statement (in CSD)

Project Cash Flow Statement

D

***** SG SCENARIO 2: 5-YEAR TERM*****

	Year End 2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Project Level - Aggregated Cash Flow												
Plus: Project Revenues[1]	0	77,792	77,792	77,792	77,792	77,792	77,792	77,792	77,792	77,792	77,792	0
Less: Project Operating Expenses[2]	0	0	0	0	0	0	0	0	0	0	0	0
Less: Project Debt Repayment	0	21,987	21,987	21,987	21,987	21,987	0	0	0	0	0	0
Operating Cash Flow for Total Project	0	55,805	55,805	55,805	55,805	55,805	77,792	77,792	77,792	77,792	77,792	0
Residence Owner Level - Individual Borrower's Cash Flow												
Plus: Annual Savings[1]	0	77,792	77,792	77,792	77,792	77,792	77,792	77,792	77,792	77,792	77,792	0
Less: Operating Expenses[2]	0	0	0	0	0	0	0	0	0	0	0	0
Less: Debt Repayment	0	21,987	21,987	21,987	21,987	21,987	0	0	0	0	0	0
Operating Cash Flow for Individual Tenant	0	55,805	55,805	55,805	55,805	55,805	77,792	77,792	77,792	77,792	77,792	0
Key Results												
Residence Owner Level												
Debt Payment as % of Total Income	0%	22%	22%	22%	22%	22%	0%	0%	0%	0%	0%	0%
Net Cash Flow as % of Total Income	0%	56%	56%	56%	56%	56%	0%	0%	0%	0%	0%	0%

Project Level	
NPV of Total Project at 18% Discount Rate	280,847
Simple Payback Period	1.22

Notes

1) Includes all project-related savings (i.e., avoided annual energy costs)

2) Includes all annual fuel and non-fuel O&M expenses (if applicable)

Project Cash Flow Statement (in CSD)

Project Cash Flow Statement

E

***** SG SCENARIO 2: 5-YEAR TERM*****

	Year End 2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Project Level - Aggregated Cash Flow												
Plus: Project Revenues[1]	0	81,293	81,293	81,293	81,293	81,293	81,293	81,293	81,293	81,293	81,293	0
Less: Project Operating Expenses[2]	0	0	0	0	0	0	0	0	0	0	0	0
Less: Project Debt Repayment	0	38,429	38,429	38,429	38,429	38,429	0	0	0	0	0	0
Operating Cash Flow for Total Project	0	42,864	42,864	42,864	42,864	42,864	81,293	81,293	81,293	81,293	81,293	0
Residence Owner Level - Individual Borrower's Cash Flow												
Plus: Annual Savings[1]	0	81,293	81,293	81,293	81,293	81,293	81,293	81,293	81,293	81,293	81,293	0
Less: Operating Expenses[2]	0	0	0	0	0	0	0	0	0	0	0	0
Less: Debt Repayment	0	38,429	38,429	38,429	38,429	38,429	0	0	0	0	0	0
Operating Cash Flow for Individual Tenant	0	42,864	42,864	42,864	42,864	42,864	81,293	81,293	81,293	81,293	81,293	0
Key Results												
Residence Owner Level												
Debt Payment as % of Total Income	0%	38%	38%	38%	38%	38%	0%	0%	0%	0%	0%	0%
Net Cash Flow as % of Total Income	0%	43%	43%	43%	43%	43%	0%	0%	0%	0%	0%	0%

Project Level	
NPV of Total Project at 18% Discount Rate	245,164
Simple Payback Period	2.05

Notes

1) Includes all project-related savings (i.e., avoided annual energy costs)

2) Includes all annual fuel and non-fuel O&M expenses (if applicable)

Project Cash Flow Statement (in CSD)

Project Cash Flow Statement

F

***** SG SCENARIO 2: 5-YEAR TERM*****

	Year End 2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Project Level - Aggregated Cash Flow												
Plus: Project Revenues[1]	0	68,459	68,459	68,459	68,459	68,459	68,459	68,459	68,459	68,459	68,459	0
Less: Project Operating Expenses[2]	0	0	0	0	0	0	0	0	0	0	0	0
Less: Project Debt Repayment	0	29,011	29,011	29,011	29,011	29,011	0	0	0	0	0	0
Operating Cash Flow for Total Project	0	39,448	39,448	39,448	39,448	39,448	68,459	68,459	68,459	68,459	68,459	0
Residence Owner Level - Individual Borrower's Cash Flow												
Plus: Annual Savings[1]	0	68,459	68,459	68,459	68,459	68,459	68,459	68,459	68,459	68,459	68,459	0
Less: Operating Expenses[2]	0	0	0	0	0	0	0	0	0	0	0	0
Less: Debt Repayment	0	29,011	29,011	29,011	29,011	29,011	0	0	0	0	0	0
Operating Cash Flow for Individual Tenant	0	39,448	39,448	39,448	39,448	39,448	68,459	68,459	68,459	68,459	68,459	0
Key Results												
Residence Owner Level												
Debt Payment as % of Total Income	0%	29%	29%	29%	29%	29%	0%	0%	0%	0%	0%	0%
Net Cash Flow as % of Total Income	0%	39%	39%	39%	39%	39%	0%	0%	0%	0%	0%	0%

Project Level	
NPV of Total Project at 18% Discount Rate	216,938
Simple Payback Period	1.83

Notes

1) Includes all project-related savings (i.e., avoided annual energy costs)

2) Includes all annual fuel and non-fuel O&M expenses (if applicable)